REMARKS

This application has been reviewed in light of the Office Action dated August 25, 2004. Claims 1, 4-9, 12-20, 23-28, 31-39, 42-47, and 50-69 are presented for examination, of which Claims 1, 9, 20, 28, 39, and 47 are in independent form. Claims 3, 11, 22, 30, 41, and 49 have been canceled, without prejudice or disclaimer of subject matter, and their recitations incorporated into their respective base claims. Claims 1, 4-6, 9, 12-14, 18, 20, 23-25, 28, 31-33, 37, 39, 42-44, 47, 50-52, and 56 have been amended to define still more clearly what Applicants regard as their invention, and Claim 57 has been amended to correct a typographical error. Claims 58-69 have been added to provide Applicants with a more complete scope of protection. Favorable reconsideration is requested.

Applicants note with appreciation the indication that Claims 3-6, 11-14, 17, 18, 22-25, 30-33, 36, 37, 41-44, 49-52, 55, and 56 would be allowable if rewritten so as not to depend from a rejected claim, and with no change in scope. Claims 1, 9, 20, 28, 39, and 47, the base claims of Claims 3, 11, 22, 30, 41, and 49, respectively, have been rewritten to include the recitation of allowable Claim 3, 11, 22, 30, 41, and 49. For the reasons provided below and that Claims 1, 9, 20, 28, 39, and 47 have been amended to include the recitation of allowable Claims 3, 11, 22, 30, 41, and 49, Applicants submit that independent Claims 1, 9, 20, 28, 39, and 47 are now in condition for allowance.

Claims 1, 7-8, 20, 26, 27, 39, 45, and 46 were rejected under 35 U.S.C. § 102(b) as being anticipated by U.S. Patent No. 5,754,710 (*Sekine et al.*), and Claims 9, 15, 16, 19, 28, 34, 35, 38, 47, 53, 54, and 57 were rejected under 35 U.S.C.

§ 103(a) as being unpatentable over *Sekine et al.*, in view of U.S. Patent No. 5,131,057 (*Walowite et al.*).

As shown above, Applicants have amended independent Claims 1, 9, 20, 28, 39, and 47 in terms that more clearly define what they regard as their invention. Applicants submit that these amended independent claims, together with the remaining claims dependent thereon, are patentably distinct from the cited prior art for at least the following reasons.

The aspect of the present invention set forth in Claim 1 is a method of clamping the output values of filtered image data comprising mapping discrete sample values. For each discrete sample value of the mapping the method determines a maximum sample value and a minimum sample value of a plurality of input discrete samples values, at least some of which represent colors, used to calculate the discrete sample value. A comparison of the number of colors represented by the plurality of input discrete sample values to a threshold value is performed. The output value of the discrete sample value is clamped to the range of the plurality of input discrete sample values utilizing the maximum and minimum sample values, depending at least on the comparison performed in the comparing step.

In response to the Examiner's comment in paragraph 5 of the Office Action, independent Claim 1 has been amended to indicate that the clamping of the output values depends "at least" on the comparison (i.e., comparing the number of colors represented by the plurality of input discrete sample values and the threshold value). In this regard, the specification at page 19, lines 14-16, states that if the number of colors in the set is smaller than a certain threshold and if the interpolated output pixel value is larger than the local

maximum, then the output value is replaced with the value of the local maximum.[1] Further, page 19, lines 19-21, states that if the number of colors in the set is smaller than the threshold and if the output value calculated is less than the local minimum, then the output value is replaced with the local minimum. Each of the above noted alternatives relies on at least the number of colors represented in the plurality of input discrete values and the comparison of the number of colors to the threshold value. Accordingly, the language of amended Claim 1 is consistent with the language of the detailed description.

As discussed previously, *Sekine et al.* relates to an image resolution conversion method and apparatus for converting the resolution of a digital image from a first resolution to a second resolution. At column 9, lines 20-59, *Sekine et al.* describes an image processing apparatus performing resolution conversion as shown in Fig. 23. The image processing apparatus comprises a max/min calculation component 4 which calculates the maximum and minimum values of four pixels blocked by a second blocking component 3B. The image processing apparatus also comprises an edge detection component 5 which finds the difference between the maximum and minimum values obtained by the max/min calculation component 4, and performs binary conversion by comparing the difference with a predetermined threshold level. If the difference between maximum and minimum values is larger than the threshold level, the edge detection component 5 outputs a 1 and if the difference is not more than the threshold level, outputs a 0. The threshold level outputs a 1 corresponding to edges where the image data changes sharply.

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[1]It is to be understood, of course, that the claim scope is not limited by the details of the described embodiments, which are referred to only to facilitate explanation.

As further described at column 10, lines 18-34, an AND gate 11 provides a logical AND of the output of a pattern-matching component 10 and the output of the edge detection component 5, which represents the binary conversion result of edge detection value of the difference between the maximum and minimum values in a block of pixels. If the output of the AND gate 11 is 0, a selector 12 selects the result of bi-linear interpolation by a first interpolation component 6 and outputs it to a converted image memory 13, and on the other hand, if the output of the AND gate 11 is 1, the selector 12 selects the result of nearest neighbor interpolation by a second interpolation component 7 and outputs it to the converted image memory 13.

At column 8, lines 31-42, *Sekine et al.* discusses that the resolution process is applied to each color signal of the color image, and to switch interpolation methods if a color image is an RGB image consisting of red, green and blue signals, and the detection of spatial information such as edge detection and pattern-matching is carried out for each of the red, green and blue signals separately. *Sekine et al.* further discusses that in the case where the color image is a YMC image consisting of yellow, magenta and cyan signals or a YMCK image further including a black signal, switching of the interpolation methods is again separately performed for each signal. That is, *Sekine et al.* discusses that the same resolution process is applied to each color signal of the color image no matter what the number of input colour signals.

Thus, *Sekine et al.* discusses an image consisting of various color signal channels (YCMK), and then applying a resolution process to each of the color signal channels. In this regard, at column 1, lines 63-67, *Sekine et al.* discusses that if conventional interpolation processes are carried out in each component of a color image

such as the red, green, and blue images of an RGB image, then there are some cases where different interpolation methods are selected for the red, green and blue images. Further, *Sekine et al.* discusses at column 8, lines 31-42, that in the case of a RGB color image, the detection of spatial information such as edge detection and pattern matching is carried out for each of the red, green and blue signals separately to switch the interpolation methods. If the color image is a YMC image consisting of yellow, magenta and cyan signals or a YMCK image further including a black signal, switching of the interpolation methods is again separately performed for each signal. That is, in the *Sekine et al.* method, the interpolation method used depends on which color channel is being interpolated.

In contrast, in the present invention, as defined by Claim 1, processing is not performed based upon the various color signal channels (described as RGB and YUV in the specification) but rather, based on the number of actual colors represented by the plurality input discrete values (page 19, lines 14-21). Further, as described at page 19, 4 by 4 input pixel values are convolved in the corresponding kernel. As a consequence, there are at most 16 colors per color channel represented in the input discrete sample values. This is not the number of color channels that may apply (which in the described embodiments is 3) but the actual number of pixel values represented by the certain combinations of those color channels.

In this respect, where there are 8 bits per color channel, in a typical RGB color channel system, this affords over 16 million separate color values. However, the present invention, as recited in Claim 1, is limited not to all of those values, nor to the number of color channels (i.e., 3) but rather to the number of colors represented by the

input discrete sample values (i.e., in the preferred embodiment at most 16 colors per color channel).

Thus, the invention as defined by Claim 1 is clearly distinguished from *Sekine et al.*, which is dependent upon the actual color channels and not the number of color values that may be derived.

As noted above, independent Claim 1 has been amended to include the recitation of allowable Claim 3.

Accordingly, Applicants submit that Claim 1 is now in condition for allowance.

Independent Claims 20 and 39 are apparatus and computer readable medium claims, respectively, corresponding to method Claim 1, and are believed to be patentable for at least the same reasons as discussed above in connection with Claim 1.

Independent Claims 9, 28, and 47 include a feature similar as to that discussed above in connection with Claim 1.

Applicants have found nothing in *Walowite et al.* that would remedy the deficiencies of *Sekine et al.* discussed above.

Accordingly, Applicants submit that Claims 9, 28, and 47 are also in condition for allowance.

A review of the other art of record has failed to reveal anything which, in Applicants' opinion, would remedy the deficiencies of the art discussed above, as references against the independent claims herein. Those claims are therefore believed patentable over the art of record.

The other claims in this application are each dependent from one or another of the independent claims discussed above and are therefore believed patentable for the same reasons. Since each dependent claim is also deemed to define an additional aspect of the invention, however, the individual reconsideration of the patentability of each on its own merits is respectfully requested.

In view of the foregoing amendments and remarks, Applicants respectfully request favorable reconsideration and early passage to issue of the present application.

Applicants' undersigned attorney may be reached in our New York office by telephone at (212) 218-2100. All correspondence should continue to be directed to our below listed address.

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